Chapter 90

The Role of Earnings Management in Equity Valuation

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Abstract

The intrinsic value of a firm's equity is determined by the present value of future payoffs to equity-holders. Thus, to estimate equity value, one needs to identify and process a series of information that is relevant to the present value of expected future payoffs. Among the value-relevant information, earnings pertain to a summary measure of firm performance, and thus play a key role in the equity valuation. Nevertheless, it is not uncommon in practice that firm managers either intentionally or unintentionally misreport earnings, making valuation challenging for outsiders. This chapter aims to explore the role earnings management plays in equity valuation, and how market participants may detect and adjust for misreported earnings, if any, in their forecasts and valuation for a firm. The chapter is organized to comprise the following sections: (i) varied managerial incentives for earnings management; (ii) various tactics of earnings management via accruals manipulation; (iii) various tactics of earnings management via real activities manipulation; (iv) consequences and determinants of earnings management; (v) trade-off between accruals manipulation and real activities manipulation to manage earnings; (vi) how to discern and measure earnings management; (vii) introduction of various equity-valuation models; (viii) how to adjust for the effects of accruals-based and real earnings management in equity valuation.

Keywords: Accruals-based Earnings Management, Real Earnings Management, Equity Valuation

JEL Classification: M41; G10; G17

90.1 Varied managerial incentives for earnings management

Investors tend to focus on earnings to make their investment decisions (e.g., Biddle et al., 1995; Francis et al., 2003; Graham et al., 2005). Therefore, managers can manipulate earnings to mislead investors' perception about the firm's future prospects. There are various scenarios in which managerial incentives for earnings management are aligned with shareholders' interests. We classify these scenarios by upwards *vis-à-vis* downwards earnings management, and expatiate on them below.

To facilitate external financing, managers manage earnings upwards prior to initial public offerings or seasoned equity offerings (Rangan, 1998; Teoh et al., 1998; Shivakumar, 2000; Haw et al., 2004). In so doing, managers can boost the market expectation of a firm's future performance, thereby selling shares at a higher price and raising more capital at a lower cost.

Prior to the announcements of stock-for-stock mergers, managers in both acquirers and acquirees are inclined to manipulate earnings upwards to increase acquisition premium which is tied to stock price (Erickson and Wang, 1999; Louis, 2004). The higher the stock prices of acquirers before the stock mergers, the fewer stocks acquirers need to swap with acquirees, and vice versa.

Most debt covenants that firms are required to meet are contingent on financial ratios (e.g., interest coverage ratio) that involve earnings numbers. Violation of the covenants can trigger penalties, including acceleration of debt repayment and increases in interest rates, for the firms. Thus, when firms are close to violating debt covenants, managers have an incentive to manage

earnings to avoid covenant violation (DeFond and Jiambalvo, 1994; Sweeney, 1994; Beneish et al., 2012).

Firms missing the earnings thresholds such as zero earnings or consensus analyst earnings forecasts would likely have a stock-price plunge. On the contrary, firms consistently meeting or beating the earnings thresholds would likely receive a price premium (e.g., Barth et al., 1999; Kasznik and McNichols, 2002; Myers et al., 2007; Bhojraj et al., 2009). Therefore, managers have a propensity to manipulate earnings upwards to meet or beat the earnings thresholds (Burgstahler and Dichev, 1997; Robb, 1998; Schilit, 2010).

Given the limited amount of internal funds available for investments or operations, financially constrained or financially distressed firms need more external funds (He and Ren, 2021). To facilitate external financing for relieving financial constraints or distress, managers have a tendency to manage earnings upwards (Loebbecke et al., 1989; Maksimovic and Titman, 1991). Firms in financial constraints or distress are often poorly-performing and thus have less to lose from getting caught with financial misconduct (Amiram et al., 2018); this further strengthens managers of these firms to inflate earnings.

Before firms repurchase stocks from open stock markets, managers of these firms have an incentive to deflate earnings to suppress the price paid for the repurchase (e.g., DeAngelo, 1986; Gong et al., 2008). The deflated repurchase price transfers wealth from the shareholders who sell (i.e., the leaving shareholders) to those who hold onto their shares (i.e., the remaining shareholders). The lower the price firms manage to suppress through earnings deflation, the more benefits the remaining shareholders would obtain through this wealth transfer; so too is

for the executives who hold a substantial amount of stocks or stock options. The likelihood of obtaining import relief and the amount of relief granted by governments will increase if a firm can show that its profitability was adversely tainted by foreign competition. As such, firms seeking import relief have a tendency to make profit-decreasing accounting discretion (Jones, 1991). Firms are also likely to make profit-decreasing accounting choices to tone down their performance to outsiders when facing fierce industrial product market competitions or high threats of new entrants (Cheng et al., 2013; Balakrishnan and Cohen, 2013; Dhaliwal et al., 2014).

Earnings management could be merely in the managers' own interests and not be aligned with the interests of incumbent shareholders. In such cases, managers' incentives for earnings management are notably stronger. For instance, the value of stocks (stock options) held by managers is contingent on the level (volatility) of stock prices (Coles et al., 2006; Low, 2009; Armstrong et al., 2013). Thus, managers holding stocks and stock options have an incentive to manipulate earnings to maximize the value of their equity-based compensation (Cheng and Warfield, 2005; Bergstresser and Philippon, 2006; Burns and Kedia, 2006; Erickson et al., 2006; Efendi et al., 2007; Cheng and Farber, 2008; Cornett et al., 2008; Armstrong et al., 2010; Jiang et al., 2010; Feng et al., 2011; Armstrong et al., 2013). The amount of bonus pay is often tied to reported earnings in excess of a pre-specified earnings level. The higher the earnings reported by managers, the higher bonus pay they can get from their companies. This incentivizes the managers to manage earnings to enlarge bonus pay (Healy, 1985; Holthausen et al., 1995).

Given high stock holdings by managers, they have an incentive to manage earnings upwards to inflate stock prices before selling shares they own (Ke et al., 2003; Beneish, 1999; Park and Park, 2004; Darrough and Rangan, 2005; Beneish and Vargus, 2002; Sawicki and Shrestha, 2014). In the same vein, managers are prone to manipulate earnings downwards to deflate stock prices before purchasing shares from open stock markets (Sawicki and Shrestha, 2014). Awards of call options on stocks can also induce managers to understate earnings. The stock options are typically granted with a fixed exercise price equal to the stock price on the grant date. The value of call options on stocks is inversely related to the exercise price of the stock options. Therefore, managers have an incentive to deflate earnings prior to option grants to lower the exercise prices of the stock options (Baker et al., 2003; Bartov and Mohanram, 2004). In line with this notion, Coles et al. (2006) find evidence of downwards earnings management in the periods following announcements of cancellations of executive stock options up to the time the options are reissued.

In essence, to the extent that investors rely on reported earnings in forming beliefs about future earnings and to trade stocks (Stein, 1989), stock prices are likely to be distorted by earnings management, thereby fulfilling various foregoing opportunistic incentives of managers.

90.2 Various tactics of earnings management via accruals manipulation

To make earnings well capture a firm's real performance, accounting standards allow firm management to have discretion in making accounting policies and estimates on various non-cash business transactions/items, such as allowance for doubtful receivables, impairment losses

on inventories, depreciation of tangible assets, which are often uncertain in terms of their actual amount accruing.[1] Such choices of accounting policies and estimates by managers result in accruals, which are part of earnings. Accruals are largely subject to managers' estimation of the nature and amount of a firm's non-cash business transactions/events, and therefore can be manipulated by managers for the purpose of distorting reported earnings.

Below we set forth the methods, which we believe are common in practice, of manipulating accruals to inflate earnings. First is the understatement of depreciation (amortization) expense for long-term (in)tangible assets. Accounting rules require that firms recognize depreciation or amortization expense on an annual basis for the reduction in the book value of long-term assets. Upon acquiring a long-term asset, managers may overestimate its economic useful life or overestimate its salvage value, such that depreciation or amortization expense for the asset will be understated. Managers may also change the depreciation method from the straight-line (or accelerated) method to the deceleration (or straight-line) method, such that the depreciation or amortization expense at the early stage of the asset's economic useful life will be understated.

The second common tactic is the capitalization of expenditures as assets recognized in the balance sheet, which should be expensed according to the related accounting standards; this would lead to inflations of both reported earnings and assets. For instance, when acquiring a long-term asset, managers capitalize costs (e.g., fine for wrong parking of trucks that transport the asset) not necessarily incurred to bring the asset to its intended use. After acquisition of a

[1] Throughout this chapter, all the accounting standards and policies mentioned are based on the general accepted accounting principle (GAAP).

long-term asset, managers capitalize the expenditures (e.g., those incurred for repairs, maintenance, additions, or litigation costs) even though these outlays are expected to benefit the firm only for the current year. Managers may even capitalize expenditures on research & development, software development layouts, and brands and membership bases that are created through advertising and promotions; the benefits associated with these expenditures are highly uncertain, hence the expenditures should be expensed rather than capitalized.[2]

The third common strategy is to delay the write-down of current or long-term assets. Once the value of the assets (e.g., intangible assets, inventories, property, plant, and equipment (PPE)) is impaired, firms are required to recognize impairment losses. Managers might not do so even when the fair value of an asset falls substantively below its book value. When managers over-buy or over-produce products in excess of market demand for the products, the value of inventories is likely to decrease; when PPE fail to sustain the production of products that meet the changing needs, preferences, and tastes of customers, the value of the PPE will decrease for the firm; when a firm is discovered by the public to have been involved in environmental, social, and governance scandals, the firm will suffer from reputational losses, and its goodwill will be impaired as a result. In all these cases, managers should write-down the book values of the assets to their fair values on a timely basis. Delayed write-down of the assets will lead to

[2] It is worth noting, though, that unlike GAAP, the International Financial Reporting Standards (IFRS) No. IAS 38 stipulate that research and development expenditures that meet certain specified criteria can be capitalized as an intangible asset. Further details can be found via the link: https://www.ifrs.org/issued-standards/list-of-standards/ias-38-intangible-assets/#about.

the overstatement of reported profits and total assets.[3]

The fourth common maneuver is to accelerate the recognition of revenues. Managers should recognize revenues only when products (services) have been delivered (provided) to customers and when cash collection is reasonably likely. Nonetheless, managers may recognize revenues when they receive cash but have not delivered products, or render services, to customers. Firms that bundle product sales with service contracts are particularly prone to, either intentionally or unintentionally, advance recognition of revenues for the services that have not yet been provided, especially for long-term service contracts. Managers may also make the advance recognition of revenues in cases when invoicing for the product delivery or service rendering has not yet occurred.

The fifth ordinary approach to boost earnings via accruals is the understatement of allowance for doubtful receivables or loan losses. Firms are required to estimate their expected customer defaults on trade receivables or loans. Managers might underestimate the amount of likely default payment by customers. As a consequence, allowance for doubtful accounts (loan losses), which are contra-accounts to receivables (loans) in the balance sheet, and the associated bad-debt-provision expense will be understated, leading to inflation of both reported earnings and total assets.

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[3] Pursuant to IFRS No. IAS 2, inventories are measured at the lower of costs and net realizable value, the latter of which equals the estimated selling price minus the estimated costs of completion and the estimated costs to sell. Details can be found via the link: https://www.ifrs.org/issued-standards/list-of-standards/ias-2-inventories/. According to IFRS No. IAS 36, if the carrying value of non-current assets (e.g., goodwill, PPE) exceeds their recoverable value, the assets should be impaired to their recoverable value, which is the lower amount of (i) fair value less costs to sell and (ii) value in use. The impairment losses can be reversed for the assets, except for goodwill, under the guidance of IFRS, whereas the reversion is not allowed if a firm follows GAAP. Further details can be found via the link: https://www.ifrs.org/issued-standards/list-of-standards/ias-36-impairment-of-assets/.

The sixth common device to inflate accruals and earnings is to underestimate various provisions (e.g., warranty coverage for products sold, provision for legal fees, provision for environmental clean-up fees) or put the provisions off balance sheet. To illustrate, the degree of future expenditures on warranty coverage for products (services) sold (rendered) is often uncertain. Managers may underestimate provisions on warranty coverage and thereby inflate earnings. Accounting standards prescribe that a firm recognizes a provision when the obligation is unavoidable, is likely to lead to a future outflow of cash, and can be reliably estimated. Managers may understate, or even not recognize, the provision, even when a liability meets all the requirements for recognition. In consequence, the associated provision expense will be understated, and earnings will be overstated.

The last common means to prop up earnings via accruals is the understatement of pension and post-retirement benefit obligations. Managers are required to estimate and report the present value of the pension benefits and other post-retirement benefits that will have been earned by employees over their years of working and services for their firm. These benefits pertain to the firm's liability to its employees, which is offset by any assets (comprised mainly of cash) that the firm set aside in the post-retirement plan. The pension and post-retirement benefit obligations are estimated based on forecasts of future wages, employee attrition rates, and the expected lives of retirees. Managers can make the forecasts to be pessimistic, such that the firm's pension obligation and associated pension expenses are understated, thereby achieving the end of inflating reported earnings.

Managers normally have the best information on the uncertainties surrounding accruals

recognition. The estimation and reporting of accruals involving the foregoing seven common tactics of accruals manipulation are hard to be challenged by outsiders who do not have access to private corporate information and are generally constrained in their abilities to process value-relevant information. This strengthens managerial incentives to make use of the accruals-manipulation tactics to boost reported earnings. By the same token, managers can manage earnings downwards by (i) overstating depreciation for non-current assets, (ii) delaying recognition of revenues, (iii) accelerating write-down of non-current or current assets, (iv) overestimating pension and post-retirement benefit obligation, (v) overestimating allowance for doubtful receivables, loan losses, or inventory obsolescence, and (vi) overestimating various provisions (e.g., warranty coverage for products sold, provision for legal fees, provision for environmental clean-up fees).

90.3 Various tactics of earnings management via real activities manipulation

Real earnings management is the purposeful action of managers to manipulate reported earnings by altering real business activities strategically. Unlike accruals-based earnings management, which changes the accounting methods and/or estimates, real activities manipulation is achieved by way of manipulating the timing and structuring of real business transactions.

There are three common ways of manipulating recurring business activities to inflate earnings (Roychowdhury, 2006). First is to accelerate the timing of sales through increased price discounts or more lenient credit terms to increase sale revenues for the current fiscal year. Second is to report lower costs of goods sold through over-production during the current fiscal

year. Per unit fixed overhead cost would be reduced as a result of overproduction, resulting in a reduction of costs of goods sold, and thus an increase in net income, for the current period. But the costs of unsold goods would increase as a result, and be eventually realized into the recognition of higher costs of goods sold in future years. Third is to reduce the current advertising, research & development, maintenance & repair, and other selling, general & administrative expenditures that would benefit a firm in the long run.

There are other ways of real earnings management, which are through non-recurring business activities. First, the number of shares outstanding would decrease as a result of stock repurchase, resulting in an increase in earnings per share (EPS). Thus, managers can launch stock repurchases for the purpose of increasing EPS (Hribar et al., 2006; Burnett et al., 2012). Second, managers make advance sales of an asset, which can still create value for a firm, to increase reported profits for the current fiscal year (Bartov, 1993; Herrmann et al., 2003). Third, a firm would not have to pay interest expense any longer after the debt is swapped by equity by the firm with its creditors. Thus, managers may advance debt-equity swaps to inflate reported profits, though their firm is not in financial constraints or distress and thus does not have to make the debt-equity swaps for the purpose of relieving the constraints/distress (Hand, 1989). Fourth, securitized accounts receivables should be sold at a point when the expected likelihood of default payments by the customers is the lowest, such that the associated securitization expense will be lowest. Managers may delay the sales of securitized accounts receivables to boost reported profits (Dechow and Shakespear, 2009). Fifth, managers advance sales of securities that are aimed for long-term investments and for taking control of related business parties.

Last but not least, real earnings management could be done via profit-shifting among related parties inside a business group. For example, real profits can be transferred between a parent company and its subsidiaries, among subsidiaries, or between a firm and its main, non-subsidiary suppliers or customers by means of getting products transacted at a price different from the market price. Or rather, a firm may manage earnings upwards by buying (selling) products from (to) its related business parties at a price lower (higher) than the market price, and may manage earnings downwards by making the purchases (sales) at a price higher (lower) than the market price. Even without transacting products at a price different from the market price, managers may shift income from a parent company to its not-wholly-owned subsidiaries to lower the net income of the consolidated income statement of the parent company, as earnings shared by minority investors of its subsidiaries would not be recognized in the consolidated income statement. Likewise, managers may shift income from the not-wholly-owned subsidiaries to their parent company to make its consolidated net income higher.

90.4 Consequences and determinants of earnings management

Were managers to inflate (deflate) earnings via accruals in the current year, the inflated (deflated) accruals would be reversed downwards (upwards) in subsequent years, leading to a fall (rise) in earnings and thereby plausible suspicion by outsiders for accruals manipulation (He et al., 2020b). There is no cost to managers for accruals manipulation if it goes undetected by outsiders. Nevertheless, if accruals manipulation is uncovered by the public, the firm will lose reputational capital, defined as the present value of improvements in net cash flows that arise when a firm's stakeholders trust that the firm will uphold and abide by its explicit and

implicit contracts and will not act opportunistically to the detriment of stakeholders (Amiram et al., 2018). The misconduct firm would be subject to higher costs of capital, lower sales, or higher operating costs, as the revelation of accruals manipulation changes the terms of contracts or tacit agreements by which varied stakeholders are willing to do business with the firm. The misconduct firm might also be subject to regulatory fines, class-action settlements, and legal expenses. The legal costs rest on the extent of accruals manipulation and the degree of losses it causes to investors and other financial statement users. As a result of the reputational losses and threat of litigation, it will be difficult or costly for the firm to finance and/or contract for investments and operations in the future, thus reducing firm value and increasing corporate default risk (Ball and Shivakumar, 2008; He, 2015, 2016). There is an array of evidence (e.g., Dechow et al., 1996; Beneish, 1999; Burns and Kedia, 2006; Karpoff et al., 2008; Gande and Lewis, 2009) to suggest that a drop in firm value as a consequence of the discovery of accruals inflation is substantively larger than the original stock price inflation.

The manipulation of accruals might also have adverse impact on the firm's business activities. For instance, companies often make investment decisions in the current period based on their past performance (He et al., 2020a). The inconsistency between the current period's investments and the previous periods' manipulated earnings might induce investors' suspicion of accruals misreporting. To lower the risk of detection, managers may adjust their firm's investments to be in line with the managed earnings. As such, accruals inflation might lead managers to overinvest in risky projects that increase corporate default risk (e.g., McNichols and Stubben, 2008; Kedia and Philippon, 2009; Kumar and Langberg, 2009); in a similar vein, accruals deflation might cause managers to underinvest in positive-net-present-value projects

that could guard against financial distress for the firm in the long run (e.g., McNichols and Stubben, 2008; Kedia and Philippon, 2009; Kumar and Langberg, 2009; He, 2015). Put differently, managers who *unintentionally* inflate (deflated) reported earnings believe the misreported growth trend and would overinvest (underinvest) accordingly in the financial markets and product markets; those who *intentionally* boost (lower) reported earnings would seek to overinvest (underinvest) as well to maintain consistency between misreported earnings and investments so as to avoid outsiders' suspicions of earnings management (Sadka, 2006; McNichols and Stubben, 2008; Kedia and Philippon, 2009). In addition, managers might lose their jobs and compensations once accruals manipulation is discovered by the public.

Unlike accruals-based earnings management, real earnings management is based on the manipulation of real activities in ways that deviate from optimal business strategies and normal business practices (Roychowdhury, 2006; Zang, 2012). Therefore, real activities manipulation, even if not detected by outsiders, will have a profound, negative influence on the firm's future performance. The larger the deviation of manipulated real activities from normal business practices, the more adverse the influence for the firm. If the manipulation is detected by outsiders, the adverse influence will be even stronger, as the detection will bring about reputational costs to the firm just as the discovery of accruals-based earnings management does.

Whether managers will manage earnings, either via real activities manipulation or accruals manipulation, depends fundamentally on whether the benefits from the earnings management are perceived by managers to be higher than the costs. Accordingly, the determinants of earnings management are related to the perceived benefits versus costs of

managing earnings. Taking the benefits as given in the foregoing settings in which managers have incentives to manage earnings, we may take the costs as varying on different firm characteristics. Larger firms, higher-growth firms, financially healthier firms, lower-risk firms, better-performing firms, and firms that face fierce industrial product market competition are less likely to manage earnings, as the reputational costs of doing so are higher for these firms. Firms with stronger internal governance, firms with more intense external monitoring, and firms whose financial statements are subject to high-quality audits are less prone to manage earnings, as the risk of detection of earnings management tends to be higher for these firms.

Below we set out a review of literature on the determinants of earnings management.

Firm size: A great deal of research provides evidence to suggest that firm size is negatively associated with the magnitude of earnings management. Large firms are more likely to have good internal control, since they normally have more assets and business transactions that need be monitored well, and have more resources to invest in internal control systems. In contrast, small firms tend to have weaker internal controls and are more likely to manipulate earnings (e.g., Kinney and McDaniel, 1989; Ge and McVay, 2005; Doyle et al., 2007; Ashbaugh-Skaife et al., 2007; Haw et al., 2004).

Growth prospect: Some prior research finds that high-growth firms have lower earnings persistence (Nissim and Penman, 2001; Penman and Zhang, 2002), which makes investors vigilant of potential earnings management, and have fewer earnings management opportunities (Richardson et al., 2005); and that high-growth firms have strong internal control in place to curb potential financial misconduct that impedes growth (Doyle et al., 2007; Ashbaugh-Skaife

et al., 2007). In low-growth firms which often have surplus free cash flow and associated agency problems, managers tend to purposefully manage earnings to avoid reporting any loss that results from rent extraction (Chung et al., 2005).[4]

Financial constraints: Financially constrained firms are those that do not have sufficient internal funds for investments, and are subject to high costs for accessing capital markets (Korajczyk and Levy, 2003). Financially constrained firms have incentives to prop-up reported earnings so as to raise external capital at a lower cost. Consistent with this notion, Campello et al. (2010) find that, when facing tight economic conditions, financially constrained firms tend to boost earnings through real activities such as a reduction in expenditures on technology and marketing. Linck et al. (2013) show that, given valuable investment opportunities, firms that are in financial constraints tend to use accruals to highlight good news.

Financial distress: Financially distressed firms are referred to as those that are unable to fulfil debt obligations in the foreseeable future. If financial distress of the firms is prolonged, they would be likely to go bankrupt. Prior studies find that financially distressed firms are likely to manage earnings upwards to conceal deteriorating performance and to avoid reported losses (Graham et al., 2005; Jaggi and Lee, 2002; Saleh and Ahmed, 2005; Rosner, 2003).

Risk: One motivation for earnings management is to alleviate the market's perception about firm risk. An increase in firm risk could be associated with a higher likelihood and extent

[4] Surplus free cash flows might induce agency problems in which managers use the cash flows for self-serving purposes.

of earnings management. We classify firm risk into business risk and information risk, the former of which includes operational risk and financial risk.

Operational risk: Previous research (Rountree et al., 2008; Hunt et al., 1997) shows that operational risk, proxied by earnings volatility or cash flows volatility, is valued negatively by investors. They would charge a higher premium for investing in a firm that has high operational risk. Therefore, managers are likely to manipulate accruals to smooth earnings so as to mitigate any adverse impact of volatile operating performance of their firm and thereby lower its cost of capital (Francis et al., 2004).

Financial risk: Financial risk refers to the risk associated with external financing, and hinges largely on the level of capital structure. Theory (e.g.,Modigliani and Miller, 1958, 1963; Mayers and Majluf, 1984; Desai et al., 2007) suggests that a good capital structure requires a good trade-off between debt and equity in the way a firm is financed. This theory has been examined in the firm-level, cross-sectional empirical analyses, with results revealing that smaller, riskier firms and those with more intangible assets, higher profitability, and stronger growth prospect are more suited for using equity rather than debt to finance their investments (e.g., Hovakimian et al., 2001; Frank and Goyal, 2009; Kayhan and Titman, 2007; Adam and Goyal, 2008). A firm's optimal capital structure can be determined by estimating the fitted value from a regression of financial leverage on its typical determinants (i.e., firm size, risk, asset tangibility, profitability, and growth). Any deviation from the optimal capital structure might increase the firm's financial risk (Leland, 1998). If financially risky firms wish to obtain new loans, the lenders will likely set tight covenants. To avoid debt-covenant violations, the

firms are likely to manipulate earnings upwards. This has been documented extensively by the extant literature (e.g., Sweeney, 1994; Dichev and Skinner, 2002; Beatty and Weber, 2003).

Information risk: Bhattacharya et al. (2003) define information risk as the risks that investors may confront due to the insufficient, imprecise, or even biased information on which to base their investment decisions. A large body of studies show that the cost of capital increases with increased information risk (Bhattacharya et al., 2003; Francis et al., 2005; Bhattacharya et al., 2011; Bharath et al., 2008; Qi et al., 2010). These studies use accruals quality as the proxy for information risk, suggesting that accruals-based earnings management would induce high information risk to a firm.

Performance: Firms that are not performing well have incentives to inflate earnings to conceal the unsatisfactory performance (Petroni, 1992; Dechow et al., 1995; DeFond and Park, 1997; Balsam et al., 1995; Keating and L. Zimmerman, 1999; Doyle et al., 2007; Kinney and McDaniel, 1989). On the other hand, the opportunity costs (i.e., personal reputational losses and compensation losses) for managers to engage in earnings management are likely to be higher for better-performing firms, hence they are less likely to get involved in earnings management.

Competition: Prior studies have investigated the relation between industrial product market competition and earnings management, but document mixed views and evidence on the relation. Some researchers argue that competition might incentivize firms to inflate earnings to attract customers and fund providers (Shleifer, 2004; Bagnoli and Watts, 2010; Markarian and Santalo´, 2014; Karuna et al., 2015). However, some argue that industrial competition has a

deterrence effect on managers' misconduct (e.g., Giroud and Mueller, 2011; Guadalupe and Pérez-González, 2010) and earnings management behavior (Balakrishnan and Cohen, 2013), because the reputational costs are higher for firms subject to fierce competition. Some studies also find that competition would impact a firm's trade-off between different tactics of earnings management. For instance, Zang (2012) finds that (non-) market leaders in an industry are more likely to resort to real activities (accruals) to inflate earnings. Shi et al. (2018) find evidence that competition is positively (negatively) associated with accruals-based (real) earnings management.

External monitoring: Extensive evidence suggests that external monitoring from auditors, financial analysts, and institutional investors mitigates earnings management. Auditing is an important external governance mechanism, which provides assurance of earnings quality to external stakeholders by monitoring the financial reporting process and curbing any misreporting therein. The existing literature (e.g., Becker et al., 1998; Francis et al., 1999; Balsam et al., 2003; Krishnan, 2003) documents that high-quality auditing reduces accruals-based earnings management. However, real earnings management is less likely to be detected by auditors, thus managers tend to engage in real activities to inflate earnings when the accruals manipulation is constrained by higher-quality audits (Chi et al., 2011).

Financial analysts and institutional investors tend to monitor earnings management because they need to rely on high-quality financial reports for purposes of valuation and/or performance evaluation. Analysts generally have the training and industrial background in accounting and finance, and are thus advantageous in monitoring via collection and analysis of

various firm-specific information and in uncovering accounting distortions (e.g., Jensen and Meckling, 1976; Healy and Palepu, 2001; He et al., 2019a). Miller (2006) and Dyck et al. (2010) offer evidence to suggest that analysts play a critical role in detecting corporate frauds in the financial marketplace. Yu (2008) and Degeorge et al. (2013) show that earnings management is negatively associated with analyst coverage. As to the role institutional investors play in monitoring earnings management, prior research shows that institutional stock ownership is negatively associated with both accruals-based earnings management (Chung et al., 2002; Mitra and Cready, 2005) and real earnings management (Bushee, 1998; Bange and De Bondt, 1998).

Corporate governance: Corporate governance helps reduce the agency problem between shareholders and managers through internal monitoring mechanisms such as board governance, ownership structure, and various governance-related committees (Jensen and Meckling, 1976). Prior studies find that firms with higher board independence (e.g., Jensen and Meckling, 1976; Dechow and Dichev, 2002), dispersed stock ownership structure (e.g., Leuz et al., 2003; Nenova, 2003; Dyck and Zingales, 2004) and effective internal audit committees (e.g., Carcello et al., 2006; Bedard and Johnstone, 2004) have less opportunistic earnings management.

Executive compensation: As noted previously in Section 90.1, one incentive for earnings management arises from stock and stock option holdings by executives. A vast literature provides evidence that executive equity compensation is positively associated with earnings management (e.g., Larcker et al., 2007; Bergstresser and Philippon, 2006). He (2015) finds that CEOs holding large inside debt are less likely to manipulate accruals. Kohlbeck and Luo

(2019) extend He (2015) by showing that CFO inside debt is negatively associated with accruals-based earnings management.

There are various empirical measures of the determinants of earnings management that are documented in prior research. We summarize these measures in the table below.

Table 90.1 Measurements of the Determinants of Earnings Management

Determinants	Measurements
Firm size	The natural logarithm of the market or book value of total assets or equity
Growth prospect	The book-to-market ratio; sales growth; assets growth; the ratio of capital expenditures to sales; the price-to-book (P/B) ratio
Financial constraints	SA index (Hadlock and Pierce, 2010); WW index (Whited and Wu, 2006); KZ index (Kaplan and Zingales, 1997); dividend payout ratio (Denis and Sibikov, 2010; He et al., 2021); retained earnings scaled by total equity; cash and cash equivalents scaled by total assets; cash flows from operating activities scaled by total assets
Financial distress	Distance-to-default and expected default frequency (Campbell et al., 2008); Altman Z-score (Altman, 1968); liquidity ratios (e.g., current ratio, quick ratio, cash ratio); solvency ratios (e.g., financial leverage, interest coverage ratio; cash coverage ratio)
Business risk	The standard deviation of earnings, sales, stock returns, or cash flows from operating and investing activities; the standard deviation of return on assets (ROA), return on equity (ROE), or return on sales (ROS)
Performance	Return on assets (ROA); return on equity (ROE); return on sales (ROS);

	gross profit margin ratio; stock returns; the natural logarithm of sales; Tobin's Q (Kaldor, 1966); total factor productivity (Sickles and Zelenyuk, 2019)
Competition	Herfindahl-Hirschman index on sales of varied firms in an industry (Harris, 1998); product substitutability, market size of competing products, entry costs (Karuna, 2007; He, 2018; He et al., 2019b)
External monitor	Analyst coverage; institutional stock ownership; audit quality (the presence of big-4 audits, the presence of internal audit committee, the ratio of audit fees to sales revenues of a firm, auditor tenure, auditor switches; auditor industrial specialization; total audit revenues of an audit firm)
Corporate governance	Board independence (e.g., the portion of independent outside directors on the board); CEO power (e.g., whether CEO is also the chairman of the board); ownership structure (e.g., Herfindahl-Hirschman index on shares of different shareholders in a company)
Executive compensation	Executive equity compensation (stocks and stock options of executives scaled by total shares outstanding; equity delta; equity vega); executive debt-like compensation (pension and deferred compensation of executives scaled by total assets)

90.5 Trade-off between accruals manipulation and real activities manipulation to manage earnings

As noted earlier, whether managers are inclined to manage earnings hinges crucially on whether the expected benefits of doing so outweigh the expected costs. Since the costs of managing accruals differ from those of managing real business activities, managers will have

to trade-off between accruals manipulation and real activities manipulation to manage earnings. Manipulating earnings via accruals does not affect the underlying business activities and cash flows of a firm, whereas managing earnings via real business activities does, and thereof will impose negative economic consequences on a firm. Nonetheless, accruals manipulation is subject to scrutiny from regulators and auditors, and entails a risk of detection and litigation by financial statement users. In contrast, real earnings management, which departs a firm from normal business practices without altering the accounting methods and/or estimates, entails relatively lower detection risk and is not subject to any legal discipline or legal cost. Therefore, given a desired level of earnings, managers tend to use accruals-based earnings management and real earnings management as substitutive instruments to manipulate earnings (e.g., Cohen et al., 2008; Bhojraj et al., 2009; Zang, 2012; Cohen and Zarowin, 2010; Badertscher, 2011; Gunny, 2010; Burnett et al., 2012; Chan et al., 2014; Kothari et al., 2016).

Accounting standards need to trade-off between granting financial-reporting discretion, which leaves room for accruals-based earnings management, and imposing mechanical, rigid reporting criteria, which creates opportunities and incentives for real earnings management. Such a trade-off seeking a good balance between the discretion *vis-à-vis* rigidity should lead to a minimization of latitude for overall earnings management, which is a challenging yet pressing task for accounting-standard setters nowadays.

90.6 How to discern and measure earnings management?

Earnings consist basically of cash and accruals. The reported amount of cash cannot be altered without changing real business activities, but the reported numbers of accruals can, simply by

changing the associated estimations such as allowance for trades receivables, impairment losses on assets, pension obligations. Therefore, one way of assessing earnings quality is to estimate abnormal levels of accruals. Before we introduce the approaches of estimating abnormal accruals, we first expatiate on the definitions and measurements of varied accruals.

Accruals are formally defined as involving changes in non-cash assets or non-cash liabilities of a firm, which denote its future cash inflows or outflows. Positive (negative) accruals reflect future benefits (obligations), or future cash inflows (outflows), for a firm. Aggregate change in non-cash assets net of aggregate change in non-cash liabilities represents the net change in expected future benefits. We thus refer to this amount as comprehensive accruals, which we calculate as change in common stockholders' equity less change in cash and cash equivalents. Comprehensive accruals are composed of operating accruals (i.e., accruals relating to operational and investing activities) and financial accruals (i.e., accruals relating to financing activities such as investments in marketable securities, interest-bearing lending or borrowing). Specifically, financial accruals are defined as change in financial assets (e.g., cash, security investments, lending) net of change in financial liabilities (e.g., debt) and of change in cash. All assets other than financial assets, and all liabilities other than financial liabilities, relate to operations of a firm (which are, in a broad sense, inclusive of investment activities).[5] Accordingly, operating accruals are computed as change in net operating assets exclusive of cash and cash equivalents, or as net operating profits after taxes and before interests less free cash flow. Operating accruals can be further categorized into working capital

[5] Throughout this chapter, we take operating activities as, in broad sense, including investing activities. As such, operating accruals are in themselves inclusive of investing accruals.

accruals (e.g., inventories, accounts receivables, accounts payables, which are short-term in nature and expected to reverse, and result in cash inflows or outflows, within a year) and long-term operating accruals (e.g., property, plant, and equipment (PPE), pension obligations, which reflect long-term future benefits or obligations). Working capital accruals are computed as: (change in current assets - change in cash and short-term investments) – (change in current liabilities - change in debt included in current liabilities); long-term operating accruals are then calculated as operating accruals minus the working capital accruals.

Apart from categorizing accruals into working capital accruals, long-term operating accruals, and financial accruals (Richardson et al., 2005), we may also decompose accruals based on whether they articulate across both balance sheet and statement of cash flows. All the changes in assets or liabilities in balance sheet, which are caused by regular operating transactions, should eventually go through statement of cash flows either in the current year or in future years. However, some "non-articulating" events, such as noncash acquisitions and divestitures, foreign currency translation adjustments, lead to changes in the balance sheet but do not cause any change in the statement of cash flows in the current or future years. As such, the non-articulating events will bring about a difference between accruals measured using the balance sheet approach (i.e., taking changes in non-cash assets or liabilities in the balance sheet) and accruals measured using the cash flow approach (i.e., subtracting operating and investing cash flows and accrued interests from net operating income before interests and after taxes). Such a difference in accruals arises from the "non-articulating" events and is thus termed non-articulating accruals. The rest of accruals are articulating accruals, which are calculated, under the cash flow approach, as net operating income before interests and after taxes less operating

and investing cash flows and accrued interests.

To estimate the abnormal level of operating accruals, we run the following modified Jones regression model by industries and years, with at least 20 firms required for each year and industry (Dechow et al., 1995):

$$\frac{OPACC_{i,t}}{Ass_{i,t-1}} = \alpha_0 + \frac{\alpha_1\left(\Delta REV_{i,t} - \Delta REC_{i,t}\right)}{Ass_{i,t-1}} + \alpha_2\left(\frac{PPE_{i,t}}{Ass_{i,t-1}}\right) + \varepsilon_{i,t} \qquad (90.1)$$

where $OPACC_{i,t}$ = operating accruals of firm i at year t; $\Delta REV_{i,t}$ = change in revenues of firm i for year t; $\Delta REC_{i,t}$ = change in accounts receivable of firm i at year t; $PPE_{i,t}$ = the net value of property, plant, and equipment of firm i at year t; $Ass_{i,t-1}$ = total assets of firm i at year t-1. Under normal operating circumstances, higher growth in cash revenues, and less PPE (denoting lower depreciation expense), are associated with more operating accruals. Therefore, it is expected that α_1 (α_2) is positive (negative) and statistically significant at a conventional level.[6] Abnormal accruals of firm i at year t would be the residual value (i.e., the actual value of $\frac{OPACC_{i,t}}{Ass_{i,t-1}}$ less the predicted value of $\frac{OPACC_{i,t}}{Ass_{i,t-1}}$) estimated from the regression model. Significantly positive (negative) abnormal accruals denote upwards (downwards) earnings management by a firm. The assumption underlying the model used to measure the degree of accruals manipulation is that accruals are innately determined by operational fundamentals regarding cash-revenue growth and fixed assets, and that any deviation from such fundamentals is attributed to managerial accruals manipulation. In the presence of non-articulating events (typically, mergers and acquisitions) for a firm, operating accruals (*OPACC*) should be replaced

[6] The parameter estimation for Model (90.1) (as well as the follow-up Models (90.2-7) used to estimate various types of earnings management) may incorporate a scaled intercept to mitigate potential heteroskedasticity attributed to the variation in the scaling variable (i.e., total assets) (e.g., Kothari et al., 2005; He, 2016).

by articulating operating accruals (*A_ACC*) in Model (1) to estimate the abnormal articulating operating accruals.

Working capital accruals can be manipulated by managers at any year they wish, but the manipulated accruals will be likely reversed in the next year, exposing a firm to a relatively higher risk of detection by outside investors. In contrast, long-term operating accruals cannot be manipulated at any year in which managers wish for a higher or lower level of earnings. For instance, at year t, managers wish for inflated earnings. But the market values of operating fixed assets are all higher than the book values of the assets, hence there is no way for managers to delay or underestimate the asset write-off in order to inflate earnings. Alternatively, managers can time their opportunistic incentives for inflating earnings to be at the point when they can manipulate the long-term operating accruals upwards. Therefore, compared with working capital accruals, long-term operating accruals are less flexible for managers to manipulate in order to achieve opportunistic objectives. That said, any manipulated long-term operating accruals tend to reverse in the distant future, and thus are less likely to be detected by outsiders. If we seek to assess whether and to what extent managers use working capital accruals (*WCACC*) to manipulate earnings, then Model (90.1) should be replaced with the following model to estimate abnormal working capital accruals:

$$\frac{WCACC_{i,t}}{Ass_{i,t-1}} = \alpha_0 + \frac{\alpha_1\left(\Delta REV_{i,t} - \Delta REC_{i,t}\right)}{Ass_{i,t-1}} + \varepsilon_{i,t} \qquad (90.2)$$

If we wish to assess whether and to what degree managers use long-term operating accruals (LTACC) to manage earnings, then Model (90.1) should be replaced with the following model to estimate abnormal long-term operating accruals:

$$\frac{LTACC_{i,t}}{Ass_{i,t-1}} = \alpha_0 + \alpha_1\left(\frac{PPE_{i,t}}{Ass_{i,t-1}}\right) + \varepsilon_{i,t} \quad (90.3)$$

It is worth noting (i) that the abnormal accruals estimated from Model (90.1) might be attributed to the differences in accounting methods adopted by firms in or between different industries, rather than to managerial accruals manipulation, and (ii) that cash flows from operations (*CFO*) in the past, current, and future years are also potential innate determinants of operating accruals for the current year. To account for these concerns in the assessment of accruals manipulation by firms, Francis et al. (2005) develop the following modified Dechow and Dichev model, which is estimated by industries and years and with at least 20 firms required of the sample for each year and industry:

$$\frac{OPACC_{i,t}}{Ass_{i,t-1}} = \alpha_0 + \alpha_1\left(\frac{CFO_{i,t+1}}{Ass_{i,t-1}}\right) + \alpha_2\left(\frac{CFO_{i,t}}{Ass_{i,t-1}}\right) + \alpha_3\left(\frac{CFO_{i,t-1}}{Ass_{i,t-1}}\right) + \frac{\alpha_4\left(\Delta REV_{i,t} - \Delta REC_{i,t}\right)}{Ass_{i,t-1}} + \alpha_5\left(\frac{PPE_{i,t}}{Ass_{i,t-1}}\right) + \varepsilon_{i,t} \quad (90.4)$$

The standard deviation of the residual values estimated from Model (90.4) for years t-4 to t is used as the refined measure of a firm's accruals manipulation. The premises underlying such a measure are that (i) any measurement error in determining accruals is attributable to either noise or management errors, and (ii) that noise is time-invariant from year t-4 to year t. Operating accruals and operating cash flows tend to be positively correlated across different years in a time-series but negatively correlated for a given year in the cross-section. Therefore, α_1 and α_3 should be positive and statistically significant at conventional levels, while α_2 should be significantly negative. High-quality accruals should well reflect future, current, and past operating cash flows, after controlling for PPE and changes in cash revenues. As with Model

(90.1), α_4 (α_5) should be significantly positive (negative).

As mentioned earlier, three common ways of manipulating recurring business activities to inflate earnings are (i) accelerating the timing of sales through increased price discounts or more lenient credit terms, (ii) lowering costs of goods sold through over-production, and (iii) reducing advertising, research & development, maintenance & repair, and other SG&A expenditures. Price discounts and grants of lenient credit terms would result in abnormally low cash flows from operations (CFO). To estimate the resulting abnormal CFO, we run the following regression model by industries and years, with at least 20 firms required of the sample for each year and industry:

$$\frac{CFO_{i,t}}{Ass_{i,t-1}} = \alpha_0 + \alpha_1\left(\frac{Sales_{i,t}}{Ass_{i,t-1}}\right) + \alpha_2\left(\frac{\Delta Sales_{i,t}}{Ass_{i,t-1}}\right) + \alpha_3\left(\frac{Prod_{i,t}}{Ass_{i,t-1}}\right) + \alpha_4\left(\frac{Disexp_{i,t}}{Ass_{i,t-1}}\right) + \varepsilon_{i,t} \quad (90.5)$$

where $CFO_{i,t}$ = cash flows from operations of firm i in year t; $Sales_{i,t}$ = sales revenues of firm i in year t; $Ass_{i,t-1}$ = total assets of firm i in year t-1; $Prod_{i,t}$ = costs of goods sold + change in inventories; $Disexp_{i,t-1}$ = advertising expenses + research and development expenses + selling, general, and administrative expenses of firm i in year t. As with Roychowdhury (2006) and Cohen and Zarowin (2010), we control for sales and change in sales for the current period, as they are the innate determinants of the current period's CFO, with larger sales and higher sales growth associated contemporaneously with more CFO. Any deviation from the two determinants is attributed to real activities manipulation by managers. Because real earnings management in terms of overproduction (reduction of discretionary expenses) has a negative (positive) impact on contemporaneous abnormal CFO too, we also include production costs

and discretionary expense in Model (90.5). It is expected that α_1 and α_2 are positive and statistically significant at conventional levels, and that α_3 and α_4 are significantly negative. The abnormal CFO attributed to price discounts and/or grants of lenient credit terms is measured by the residual value (i.e., the actual value of $\frac{CFO_{i,t}}{Ass_{i,t-1}}$ minus the predicted value of $\frac{CFO_{i,t}}{Ass_{i,t-1}}$) estimated from Model (90.5). The abnormal CFO being significantly negative denotes upwards real earnings management in respect of price discounts and/or grants of lenient credit terms.

Real earnings management in terms of overproduction would lead to abnormally high production costs. To estimate the abnormal production costs, we run the following regression model by industries and years, with at least 20 firms required of the sample for each year and industry (Dechow et al., 1998; Roychowdhury, 2006):

$$\frac{Prod_{i,t}}{Ass_{i,t-1}} = \alpha_0 + \alpha_1\left(\frac{Sales_{i,t}}{Ass_{i,t-1}}\right) + \alpha_2\left(\frac{\Delta Sales_{i,t}}{Ass_{i,t-1}}\right) + \alpha_3\left(\frac{\Delta Sales_{i,t-1}}{Ass_{i,t-1}}\right) + \varepsilon_{i,t} \qquad (90.6)$$

Abnormal production costs of firm i at year t are equal to the residual value (i.e., the actual value of $\frac{Prod_{i,t}}{Ass_{i,t-1}}$ minus the predicted value of $\frac{Prod_{i,t}}{Ass_{i,t-1}}$ estimated from the regression model). Production costs comprise costs of goods sold and change in inventories, with the former (latter) positively associated with the current year's sales (with the current and previous years' sales growth) (Dechow et al., 1998; Roychowdhury, 2006). Accordingly, we expect α_1, α_2, and α_3 to be positive and statistically significant at conventional levels. The rationale underlying this modeling is that production costs are innately determined by the sales and sales growth, and that any deviation from the innate determinants is attributed to real earnings management as to overproduction. Significantly positive abnormal production costs denote upwards real earnings management via overproduction by a firm.

Real earnings management via strategic reduction in discretionary expenditures would result in abnormally low discretionary expenses. To estimate the resulting abnormal expenses, we run the following regression model by industries and years, with at least 20 firms required of the sample for each year and industry (Dechow et al., 1998; Roychowdhury, 2006):

$$\frac{Disexp_{i,t}}{Ass_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{Sales_{i,t-1}}{Ass_{i,t-1}} \right) + \varepsilon_{i,t} \qquad (90.7)$$

Abnormal discretionary expenses of firm i at year t are equal to the residual value (i.e., the actual value of $\frac{Disexp_{i,t}}{Ass_{i,t-1}}$ minus the predicted value of $\frac{Disexp_{i,t}}{Ass_{i,t-1}}$) estimated from Model (90.7). The current period's advertising expenses, research and development expenses, selling, general, and administrative expenses are incurred largely based on the previous period's sales revenues. The higher the sales for the previous year, the high discretionary expenses incurred for the current year. Therefore, we expect α_1 to be positive and statistically significant at a conventional level. A significantly downward deviation from the innate determinant of discretionary expenses (i.e., sales lagged for one year) is attributed to managers strategically cutting down on discretionary expenditures for the purpose of propping up reported earnings.

Lastly, we may aggregate the three real earnings management measures into one proxy either by subtracting the abnormal discretionary expenses and the abnormal CFO from the abnormal production costs, or by using common factor analysis to construct a composite measure.

In addition to the foregoing regression analysis, we may use various red flags regarding abnormal accounting changes to appraise potential earnings management by a firm. We summarize a host of red flags, which can be commonly used in practice, in the table below.

Table 90.2 Red Flags on Different Types of Earnings Management

Types of earnings management	Red flags
Accelerated recognition of revenues	An abnormal increase in credit sales or trades receivable towards the end of the year
Understatements of allowance for doubtful receivables or loan losses	An unusual increase in trades receivables relative to sales increases; significantly growing days' receivable; business downturns for a firm's major customers; significantly growing loan delinquencies
Understatements of pension and post-retirement obligations	An abnormally large or increasing pension deficit (i.e., the case in which the funds set aside in the pension benefit plans are significantly less than the pension obligations)
Capitalization of expenditures which should otherwise be expensed	A substantive decline in relevant operating asset turnover ratio
Delayed write-down of current operating assets such as inventories	An unusual increase in inventories relative to sales increases; significantly growing days' inventory; significant write-down of inventories by non-competitors in the same industry; business downturns for a firm's major clients
Delayed write-down of long-term operating assets	A substantive decline in the long-term operating asset turnover ratio; declines in return on assets (return on equity) to a level lower than the weighted average cost of capital (cost of equity capital); significant write-down by non-competitors in the same industry which have also suffered from deterioration of long-term operating assets; overpayments for, or unsuccessful, mergers and acquisitions

Understatements of depreciation or amortization on long-term operating assets	An unusual decrease in the overall depreciation (amortization) rate of long-term (in)tangible operating assets; a substantive decline in the long-term operating assets turnover ratio
An inflation of overall operating accruals	Operating accruals of a firm is abnormally higher than the industrial average/median of operating accruals; an abnormal increase in the gap between a firm's reported earnings (operating income) and its cash (cash flows from operations)
Acceleration of the timing of sales in terms of increased price discounts or more lenient credit terms	A significant reduction in the gross profit margin ratio; an abnormal increase in trades receivables relative to sales
Reduction of costs of goods sold through over-production	Production costs of a firm are abnormally higher than the industrial average/median of production costs; an abnormal increase in production costs
Reduction of discretionary expenses (e.g., advertising, research & development, maintenance & repair, and other SG&A expenditures) that would benefit a firm in the long run	Discretionary expenses of a firm are abnormally lower than the industrial average/ median of discretionary expenses; an abnormal decrease in discretionary expenses

It should be noted that the red flags might be merely reflective of a firm's changed business strategies and/or circumstances, rather than attributed to earnings management motives. For example, a firm which has abnormal increases in its inventories relative to sales might have been introducing a new, better product or product line, rather than overproducing the existing type of products. Abnormal decreases in the allowance for uncollectible receivables relative to sales might be due to a firm changing customer base in ways that cover more financially healthy

customers, rather than the firm understating its allowance for uncollectible receivables. Thus, it is important to appraise a firm's potential red flags in the context of its business strategies and/or circumstances. When a firm has high business risk, it will be difficult for us to distinguish whether red flags are attributed to unexpected changes in a firm's business conditions or to questionable accounting numbers. In such a case, we had better use the foregoing regression analysis rather than the red flags to assess the firm's accounting quality.

90.7 Introduction of various equity-valuation models

The intrinsic value of a firm or stock is determined based on the present value of expected future payoffs from the firm or stock to an investor. The future expected payoffs are discounted at a rate reflecting the time value of money and the uncertainty of these payoffs. The stock price which represents the market expectation of a firm's intrinsic value does not necessarily equal the value of a stock at any point in time. Therefore, analyzing whether and to what degree the stock price deviates from its intrinsic value provides a reliable basis for investors and financial analysts to assess the investment potential of a firm or stock. Investors could gain by buying (selling) the stock if its price is lower (higher) than its intrinsic value. However, unlike the observable price, the value of a firm is invisible and can only be estimated. To this end, we need to first identify what kind of information is relevant to, and has implications for, the present value of the expected future payoffs, and then utilize the value-relevant information to forecast the future payoffs from the firm. Depending on how the payoffs are measured, four primary equity valuation models can be used: (i) dividends valuation model (DVM) which requires forecasts of future dividends (e.g., Gordon, 1962), (ii) residual earnings valuation

model (or abnormal earnings valuation model (AEVM)) which requires forecasts of future residual earnings (e.g., Edwards and Bell, 1961; Peasnell, 1982), (iii) free cash flows valuation model (FCFVM) which requires forecasts of future free cash flows (e.g., Damodaran, 2002), and (iv) residual operating income valuation model (ROIVM) (or abnormal operating profits valuation model (AOPVM)) that requires forecasts of future abnormal operating profits. The forecasts involving the application of the four valuation models are based on the value-relevant information, which comes primarily from the audited financial statements.

Dividends are the primitive form of shareholder payoffs, as they represent the income received by shareholders for holding a firm's stocks. Nonetheless, to maintain a clean surplus relationship (i.e., change in book value of equity for shareholders equals earnings after dividends) for accurate valuation of the shareholders' equity, the dividends used in the valuation model encompass all cash flows distributed from the firm to shareholders through not only regular dividend payments but also liquidating dividends, stock repurchases, and the stock issuances in which cash collected from shareholders are considered as negative dividends. In applying the dividend valuation model to value a firm's stocks, we discount all the expected future dividends to their present values over the expected life of the firm in the following way (e.g., Gordon, 1962):

$$V_0 = \frac{D_1}{(1+\rho_E)} + \frac{D_2}{(1+\rho_E)^2} + \ \ldots\ldots = \sum_{t=1}^{\infty} \frac{D_t}{(1+\rho_E)^t} \tag{90.8}$$

where V_0 is the intrinsic value of a firm or stock, which refers to the present value of expected future payoffs measured by net dividends; D_t refers to net dividends, computed as

cash dividends minus cash from share issuances plus cash from share repurchases, and representing overall net cash flows to shareholders. D_t and V_0 can be either net dividends per share and equity value per share, respectively, or net dividends and equity value, respectively. ρ_E is the cost of equity, which is computed as: $r_f + (r_m - r_f) * \beta$, where r_f is the risk-free rate, $r_f - r_m$ is the market risk premium, and β is the firm's beta. Before being used as the discount rate for the model, ρ_E needs to be adjusted for the effect of any potential accruals-based earnings management (denoting high information risk), of any significant change in the firm's liquidity and solvency positions, and of any substantial change in operational risks of the firm, in the current period as well as the foreseeable future. This adjustment also applies to the discount rate used for the other three valuation models.

Dividend valuation model measures shareholder payoffs by the cash distribution in the form of dividends paid by the firm to shareholders. Free cash flows (i.e., cash flows that are available for distribution to shareholders and debtholders after capital expenditures on investments and operations) can also be used to measure the expected shareholder payoffs for the valuation of a firm or stock. In such a case, the free cash flow valuation model should be used, with the firm's value estimated as (e.g., Damodaran, 2002):

$$V_0 = \frac{FCF_1}{(1+WACC)} + \frac{FCF_2}{(1+WACC)^2} + \ \ldots\ldots = \sum_{t=1}^{\infty} \frac{FCF_t}{(1+WACC)^t} \qquad (90.9)$$

where V_0 is the intrinsic value of net operating assets, including equity and debt, of the firm; FCF is free cash flows, calculated as cash flows from short-term operations before interests and after taxes (CFO) minus capital investments (CI). Free cash flows can also be

calculated as net operating profits after taxes and before interests (NOPAT) minus change in net operating assets (ΔNOA), and in specific as: [net income + (after-tax interest expense – after-tax interest income)] – {Δworking capital + [(expenditures for non-current operating assets – sales of non-current operating assets) – depreciation & amortization expense]}. Since free cash flows are for distribution to both shareholders and debtholders, the discount rate we use to divide the free cash flows is the weighted average of the cost of equity and cost of debt, expressed as follows:

$$WACC = \frac{\rho_E * E + \rho_D * (1 - T_c) * D}{E + D} \tag{90.10}$$

where ρ_E is the cost of equity; ρ_D is the cost of debt which is calculated as net interest expense before taxes (NIE) divided by net debt (ND) (also named net financial obligation). If net financial assets are larger than net financial obligation, or if interest income is larger than interest expense, NIE/ND of an industrial peer firm that has the same credit rating as the firm being valued could be used as the alternative proxy for the firm's expected cost of debt (ρ_D); T_c is corporate income tax rate; E is the book value of equity; D is the book value of debt.

Earnings are a summary measure of firm performance and thus form an essential basis for investors to make investment decisions (e.g., Biddle et al., 1995; Francis et al., 2003; Graham et al., 2005). It is thus reasonable for valuers to use future earnings as a proxy for the future payoff that an investor expects to get from the firm. Accordingly, we have the residual earnings valuation model (e.g., Edwards and Bell, 1961; Peasnell, 1982), in which the value of a firm is estimated based on the future residual earnings as follows:

$$V_0 = B_0 + \frac{AE_1}{(1+\rho_E)} + \frac{AE_2}{(1+\rho_E)^2} + \ \ldots\ldots = B_0 + \sum_{t=1}^{\infty} \frac{AE_t}{(1+\rho_E)^t} \qquad (90.11)$$

where ρ_E is the cost of equity; B_0 is the book value of common shareholders' equity at the point of doing the equity valuation; V_0 is the intrinsic value of a firm's equity, and represents the present value of expected future shareholder payoffs measured by residual earnings; AE_t is the residual earnings, also known as residual income or abnormal earnings, at year t, and is computed as: $E_t - \rho_E * B_{t-1}$. An alternative way of writing *AE* and Model (90.11) is (e.g., Ohlson, 1995; Lee et al., 1999):

$$V_0 = B_0 + \sum_{t=1}^{\infty} \frac{(ROE_t - \rho_E) * B_{t-1}}{(1+\rho_E)^t} \qquad (90.12)$$

where $ROE_t = \frac{E_t}{B_t}$ is the return on equity, representing the expected return on the book value of equity in year t. Model (90.12) suggests two key value drivers, which are return on equity (ROE) and growth in equity (as reflected in B_t relative to B_{t-1}); when the expected return on equity is larger (smaller) than the cost of equity, the firm will experience value-added (-destroying) growth.

The residual earnings valuation model values a firm on the basis of the book value of equity with any excess of required earnings added to the book value, and emphasizes the excess earnings created from the equity. It is worth noting that financial activities do not create value for a firm, if financial assets are traded at a fair price, and if this trading does not pertain to a firm's main business. Therefore, it is important to distinguish the operating activities (inclusive of investing activities) from financing activities for valuation purposes. Given that value is

created primarily from operating activities, it is reasonable to measure the expected payoffs from a firm by the residual income from net operating assets, namely, residual operating income. Accordingly, we have the residual operating income valuation model expressed as:

$$V_0 = NOA_0 + \sum_{t=1}^{\infty} \frac{AOP_t}{(1+WACC)^t} \tag{90.13}$$

where V_0 is the intrinsic value of net operating assets, including equity and debt, of the firm; NOA_0 is the net operating assets at the point of doing the asset valuation; WACC is the weighted average cost of capital, defined as previously; AOP is the abnormal operating income, also known as residual operating income. It is defined as: $AOP_t = NOPAT_t - WACC * NOA_{t-1}$, where NOPAT refers to the net operating profits after taxes and before interests, and equals net income plus after-taxes net interest expenses. An alternative way of writing AOP and Model (90.13) is as follows:

$$V_0 = NOA_0 + \sum_{t=1}^{\infty} \frac{(RNOA_t - WACC) * NOA_{t-1}}{(1+WACC)^t} \tag{90.14}$$

where $RNOA_t = \frac{NOPAT_t}{NOA_{t-1}}$, representing the expected return on net operating assets at year t. A firm will add (lose) value in year t in which the expected return on net operating assets is larger (smaller) than the weighted average cost of capital.

The dividends valuation model and residual earnings valuation model value the equity of a firm, while the free cash flows valuation model and residual operating income valuation model value the assets of a firm. So, when using the latter two models, the estimated value of net operating assets needs to be further deducted by the market value of net financial obligation,

which approximates its book value due to the fixed interest income/expenses stipulated in the debt contracts, to get the value of the firm's equity.

Equity valuation is done by way of estimating the present value of expected future payoffs from investing in the stocks of a firm. Which of the four valuation models will be the best for use in the valuation depends critically on which form of future payoffs is best-founded yet easiest to forecast. Future dividend payouts depend on future cash adequacies, future investment opportunities, future operational needs, and future debt repayments. Future free cash flows hinge on future cash adequacies, future investment opportunities, and future operational needs. Forecasts of future residual earnings involve forecasts of future financial obligations such as future interest income or expenses and future financial leverage. Future abnormal operating profits rest exclusively with the future operational activities and performance, from which firm value is created. Therefore, the residual operating income valuation model offers the most reliable and scientific ground on which to estimate the intrinsic value of a firm in a relatively accurate manner, compared with the other three valuation models. Below we set forth more details on the application of the residual operating income valuation model.

The residual operating income valuation model anchors the expected shareholders-and-debtholders payoffs on future residual operating income that is fundamentally determined by three main factors. First is a firm's competitive advantage established via differentiation or cost-leadership strategies and against industrial competitive forces or threats. Second is the industrial growth rate which reflects the growing market demand for a firm's products or

services. Third is the rate of return required by capital providers, which will be reduced if the uncertainty of future payoffs in terms of business risk, information risk, or market risk decreases. AOP in year t can be expressed in an alternative way as: $AOP_t = NOPAT_t - WACC * NOA_{t-1} = NOPM_t * sales_t - WACC * \frac{sales_t}{ATO_{t-1}}$, where NOPM is the net operating profit margin ratio, and ATO is the operating asset turnover ratio. As such, the forecast of future AOP can be transformed into a job of the forecasts of future sales, NOPM, ATO, and WACC, which are grounded on analyses of a firm's sales performance, operational efficiency, investment efficiency, and financing, respectively.

To facilitate accurate valuation under the residual operating income valuation model, we typically take three steps to forecast future AOP. First, we choose a finite forecast horizon (usually, 5-10 years) within which the specific trends of future sales, NOPM, and ATO can be reasonably forecasted. Second, we forecast future sales, NOPM, and ATO at the chosen forecast horizon. These forecasts should be made based on (i) the analyses of a firm's business strategies and industrial competitive forces, (ii) time-series and cross-sectional analyses of historical sales, NOPM, and ATO, and (iii) real earnings management, if any. Third, we make some simple assumptions for our long-term forecasts of AOP at years after the end of the chosen forecast horizon. For instance, if we believe that the firm can enlarge its abnormal profits beyond the short run, we may make a simple assumption that, after the end of the forecast horizon, AOP will grow at a constant rate (which we term terminal growth rate) in perpetuity. We then refine the residual operating income model as:

$$V_0^{NOA} = NOA_0 + \frac{AOP_1}{(1+WACC)} + \frac{AOP_2}{(1+WACC)^2} + \ \ldots\ldots + \frac{AOP_T}{(1+WACC)^T} + \frac{CV_T}{(1+WACC)^T} \quad (90.15)$$

where V_0^{NOA} is the value of net operating assets, standing for the value of a firm to both shareholders and debtholders. The value of equity is then estimated via: $V_0^E = V_0^{NOA} - V_0^{NFO}$, where V_0^{NFO} is the value of net financial obligation. The subscript T in Model (90.15) represents the number of years over the finite forecast horizon; CV_T is the continuing value beyond the chosen forecast horizon. Provided that AOP will grow permanently at a rate of g beyond the short-term forecast horizon, $CV_T = \frac{AOP_{T+1}}{WACC-g} = \frac{AOP_T*(1+g)}{WACC-g}$. On the other hand, if we assume AOP to be zero after the end of the forecast horizon, $CV_T = 0$; if we presume that AOP will remain constant and perpetual since the final year of the forecast horizon, $CV_T = \frac{AOP_{T+1}}{WACC} = \frac{AOP_T}{WACC}$. To facilitate more accurate forecasts of the terminal growth rate, we may further assume that, after the end of the finite forecast horizon, NOPM and ATO remain constant, and sales will grow at a constant rate or remain unchanged. Under such an assumption, AOP is a linear function of sales, thus the terminal growth rate in AOP equals the terminal growth rate in sales. As such, forecasts of the terminal growth in AOP are equivalent to forecasts of the terminal growth in sales, yet the latter will be more feasible for us.

After we apply the residual operating income model and estimate the equity value per share, we compare it with the stock price to aid in our investment decision-making. If the estimated equity value per share is significantly higher (lower) than the stock price, stock purchases (sales) are recommended. If the estimated equity value per share is insignificantly different from the stock price, it is advised to hold the stocks. Various risks which a firm is

exposed to will make its future sales, ATO, NOPM, WACC, and terminal growth rate differ from the forecasted ones, increasing the uncertainty of, and error in, our forecasts and valuation. Thus, we need to perform sensitivity analysis in the meantime to see how sensitive the estimated equity value per share is to the changes in the forecast inputs across a certain range.[7] Provided that the estimated equity value per share is highly sensitive to the forecast inputs and that we are uncertain about the accuracy of our forecasts, then a high upwards (downwards) sensitivity of the estimated equity value per share should lead us towards making buy (sell) decisions, *ceteris paribus*, while a high symmetric sensitivity should lead us towards holding the stocks, *ceteris paribus*. With all that said, the investment decisions made based on the foregoing analysis of fundamental values of stocks are premised on investors holding long-term investment horizons. If investors hold short-term investment horizons and seek to arbitrage on stock return anomalies, the fundamental value of stocks will be of less relevance for making profitable stock trades (He, 2021).

90.8 How to adjust for the effects of accruals-based and real earnings management in equity valuation?

Upwards accruals-based earnings management is just like borrowing future earnings for current use, thus earnings would be reversed and decline in the subsequent periods. Say, firms that delay writing-off assets in the current year would have to write them off in the future years. In

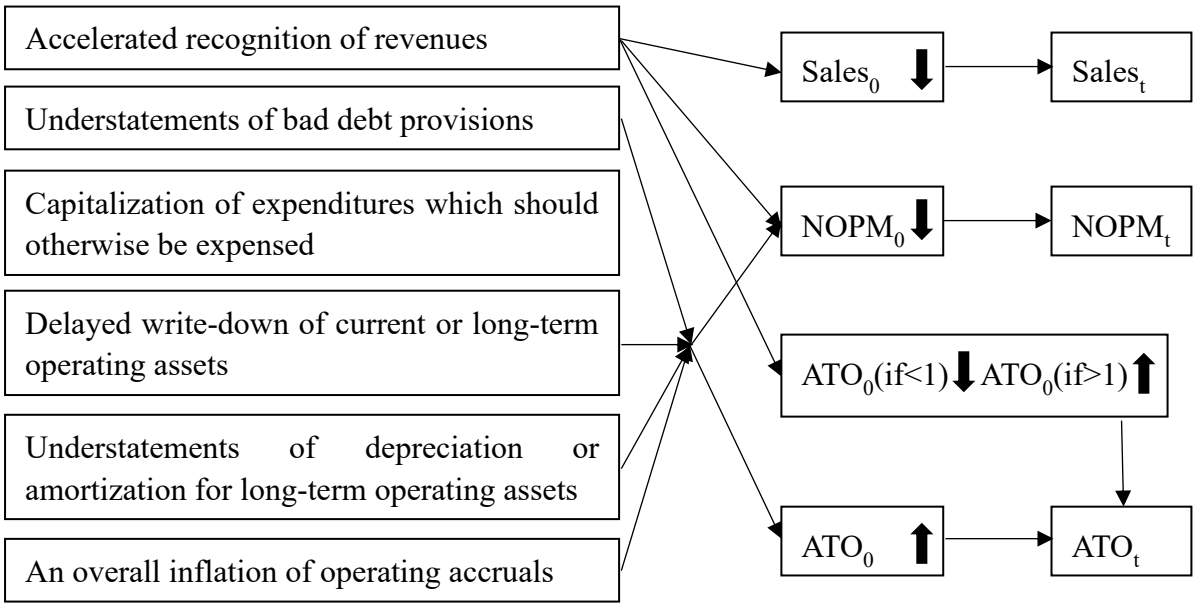
[7] For example, if we speculate that the firm's liquidity and solvency positions will plausibly deteriorate in the near future, we need to first gauge the extent to which WACC will increase in consequence, and then estimate how large the estimated equity value per share will decrease as a result of the increase in WACC. On the other hand, if we are certain that the firm's liquidity and solvency positions will deteriorate, we should factor this into our estimation of discount rate (i.e., WACC) rather than in the sensitivity analysis.

cases when we discern a firm's accruals manipulation in our valuation, we need to ensure that our forecast horizon is long enough (often at least five years and preferably 8-10 years) to allow accruals manipulation to play out by itself, even if the firm is in a mature industry with a well-established product line, stable prices of input products, robust production technologies, and stable market demand. Meanwhile, because accruals manipulation subjects a firm to a risk of detection and thereof to the related negative economic consequences, such risk needs to be factored into our estimation of the weighted average cost of capital (WACC) or into the test of the sensitivity of our estimated equity value per share to the WACC. Also, we need to adjust the weight we put on the current figures that are used in our forecasting.

Suppose we use the residual operating income model to value a firm's equity. If we spot that a firm has accelerated recognition of sales revenues in the current year, we should put less weight on the current sales revenues (current NOPM) that are used in the forecasts of future sales (future NOPM), and put more (less) weight on the current ATO that is used for forecasting future ATO if current ATO is higher (lower) than 1. If we detect an inflation of operating accruals via asset or liability distortion, we should put less (more) weight on the current NOPM (current ATO) when using it to forecast future NOPM (future ATO). The graph below illustrates how we should adjust the weight put on the current value-oriented figures when using them to forecast their future figures.[8]

[8] The same rationale and approach can be applied when we assess the role of downwards accruals manipulation in our forecasting and valuation.

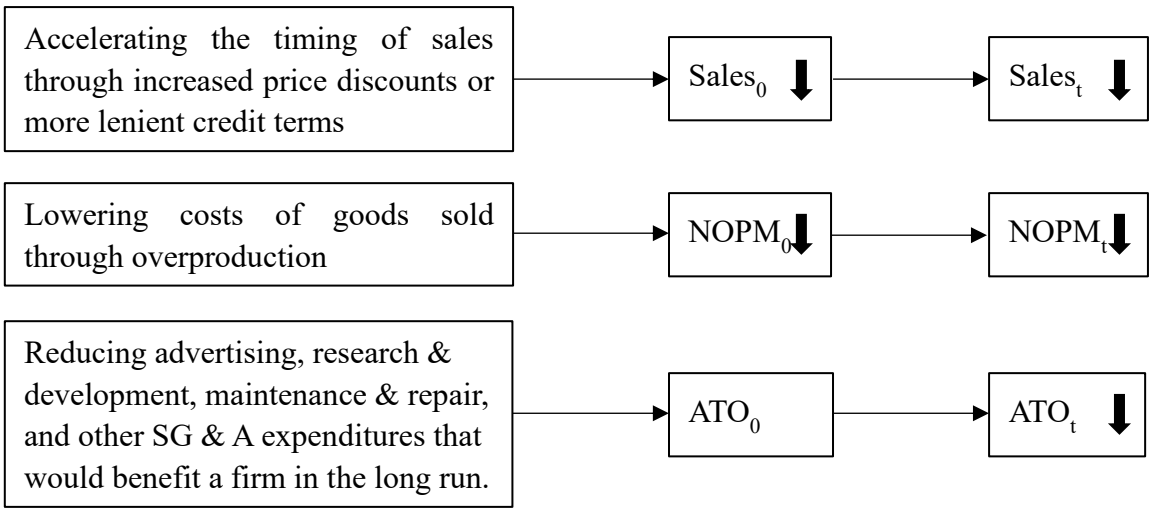
Figure 90.1 Adjustment of Accruals-based Earnings Management in Equity Valuation



Real earnings management subjects a firm to a relatively low risk of detection. As such, we don't need to adjust the discount rate (i.e., WACC) for the effects of real earnings management. However, unlike accruals-based earnings management, real earnings management that deviates a firm's optimal business strategies has negative real effects on a firm's future sales, NOPM, and ATO. Hence, our forecasts of future sales, NOPM, and ATO need to be adjusted downwards for the effects of the real earnings management; in the meantime, we need to put less weight on some of the current figures (i.e., sales and NOPM) used to forecast their future figures. The graph below portrays how to do these in the case when we use the residual operating income model to value a firm's equity.[9]

Figure 90.2 Adjustment of Real Earnings Management in Earnings Management

[9] We may use the similar approach to assess the role the downwards real earnings management plays in the forecasting and valuation.



In specific, when we discern that managers have accelerated the timing of sales through giving increased price discounts or more lenient credit terms to customers, we should put less weight on the current sales that are used for forecasting future sales; then for the future sales forecasted based on current sales, we further adjust the future sales downwards. When we spot that a firm strategically reports lower costs of goods sold by virtue of over-production, we should put less weight on the current NOPM that is used in the forecasts of future NOPM, and further, adjust the forecasted future NOPM downwards. When we discover the strategic reduction of advertising, research & development, maintenance & repair, and other selling, general & administrative expenditures that would benefit a firm in the long run, we do not need to adjust the current ATO that is used for the forecasts of future ATO, but we need to adjust our forecasted future ATO downwards.

What if we see through real earnings management that is achieved via non-recurring business activities (e.g., asset sales, debt-to-equity swaps, sales of securities that should have been aimed for long-term investments)? We don't need to make any adjustments in our

forecasting, provided that the current value-oriented figures (e.g., ATO, NOPM) used for the forecasting are purged of non-recurring operating items.

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